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ABSTRACT

A study was done to determine the 1988-90 sustained gains in reading or mathematics among students in grades two through five in Seattle (Washington). These students were not retained but given compensatory education for 1 of the 2 years through one of the following models: (1) a traditional "pull-out" approach in reading and/or mathematics; (2) computer assisted instruction in reading and/or mathematics; (3) individual tutoring in reading by community volunteers; and (4) a reading resource specialist approach. A comparison group consisted of all students who were in grades two through five in 1988-90 who did not receive compensatory education service and were not retained. Comparison of gains in reading revealed that pull-out and computer assisted instruction recipients showed significantly larger gains than the comparison group. For mathematics, only pull-out participants showed gains that were significantly greater than gains made by the comparison group. Gains among computer assisted participants approached significance. When comparing these findings with those of 1983-85 and 1985-87, a significant positive effect of the pull-out approach on both reading and mathematics scores was consistent throughout. Results for the tutors were also consistently positive but not always significant due to the small number of participants. Results for computer assisted instruction have been unimpressive until the present study. Included are three references, four tables of data, and four graphs. (JB)

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COMPENSATORY EDUCATION SUSTAINED GAINS FROM SPRING 1988 TO SPRING 1990

REPORT NO. 91-1
MARCH, 1991

MADELAINE RAMEY

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COMPENSATORY EDUCATION
SUSTAINED GAINS FROM
SPRING 1988 TO SPRING 1990

The Seattle School District's 1988-90 sustained gains study uses a definition of sustained gain that parallels that used in two earlier District sustained gains studies (Ramey & James, 1985; Ramey, 1990). That is, a student's sustained gain is the reading or math test score gain he made from spring 1988 to spring 1990, a period that includes a year of compensatory education service in 1988-89 and no compensatory education service for the 1989-90 school year.

Students who fit the above pattern of service, were in grade 2, 3, 4, or 5 in 1988-89, were not retained in grade during 1988-90, and have California Achievement Test (CAT) scores for spring 1988, 1989, and 1990 comprise the study group. Study group students may have been served through any one of four instructional models: (1) a traditional 'pull-out' approach in reading and/or math, (2) computer assisted instruction (CAI) in reading and/or math (also called 'prescriptive' reading and math), (3) individual tutoring in reading by community volunteers (HOSTS--Helping One Student to Succeed), or (4) a reading resource specialist (RRS) approach.

The comparison group consists of all students who were in grade 2, 3, 4, or 5 in 1988-90, did not receive compensatory education service, and were not retained in grade during 1988-90.

The following gives the study's two questions and their answers, which were obtained by analyses of CAT score data. Please see the Methodology Note at the end of this report for details of the analyses.

1. Are the 1988-90 gains for study group students in any of the compensatory reading or math programs (Pull-Out, CAI, HOSTS, or RRS) greater than those for the comparison group?

   Tables 1A and 1B and Tables 2A and 2B show the primary and intermediate elementary results respectively. (The reader might find that Figures 1A through 2B present a clearer display of the same results.) At the primary level, for reading, both Pull-Out and CAI participants showed gains that were significantly greater than gains for the no intervention comparison group; the small number of HOSTs participants make it difficult to attain statistical significance, even though observed gains are fairly large. For math, only Pull-Out participants showed gains that were significantly greater than gains made by the comparison group, although gains made by CAI participants approached significance.

   At the intermediate level, for reading, Pull-Out participants showed gains that were significantly greater than gains made by the comparison group; HOSTs participants' gains approached significance; and CAI and RRS participants' scores showed a nonsignificant negative trend relative to scores for the comparison group. Math results were the same as for

primary students: significance for the Pull-Out model and a nonsignificant positive trend for the CAI model.

2. How do these findings compare with those of the 1983-85 and the 1985-87 sustained gains studies?

A significant positive effect of the Pull-Out approach on both reading and math scores has been a consistent finding throughout the three studies; however, this (1988-90) is the first time that it occurs for primary students. Results for HOSTs have also been consistently positive, but not always statistically significant; the small number of students participating in HOSTs mitigates against statistical significance. Results for CAI have been unimpressive up until this present study in which a significant positive result occurred for primary reading. RRS results have been nonsignificant throughout the three studies, sometimes in positive direction and sometimes, as in the present study, in a negative direction.

The consistent positive findings for the Pull-Out model at the intermediate elementary level are impressive. Since this evaluation looks only at outcomes, and not at process, the reasons for the model's impressive showing can only be guessed. Perhaps Pull-Out is successful because it permits more one-to-one interaction between teacher and student or because the teacher is better able to match instruction with student ability level or for some other reason(s) yet to be identified.

HOSTs has also shown up well over the time period covered by the three studies. Again, a real test of this model's effectiveness requires that a larger number of students be assigned to it. The inconsistent finding for CAI might be due to year-to-year changes in nature and degree of implementation. The RRS approach has not shown up well, but we lack information as to whether it has been implemented according to the model.

Concerns such as these, whether or not an approach actually follows the model which presumably guides it, whether the model is strongly or weakly implemented during a given year, and even the reason(s) for consistent successful outcomes, can be addressed only by a process evaluation. A process evaluation is, as the name implies, one which examines the day-to-day operation and management of the program and reports on its adherence to or deviation from the model which impels it. It can also be expected to uncover difficulties in implementation as well as practices that promote success.

It is recommended that Compensatory Education administration undertake a process evaluation, one which examines the day-to-day program operation and management of the four service delivery models examined here. Such an evaluation could be conducted "in house", by Compensatory Education management, with input and consultation from the District's Evaluation Office staff and/or from an agency outside the District.

METHODOLOGY NOTE

Analyses used Total Reading and Math scores for spring 1988, spring 1989, and spring 1990 for both the study and comparison groups. Statistical tests of significance were applied only to differences between 1988 and 1990 scores. The metric used in assessing differences was the standardized change score, which was computed by standardizing (subtracting the mean and dividing by the standard deviation of) test publisher's scale scores across both groups for each year and subtracting 1988 from 1990 standardized scores. Standardization was done separately for primary and intermediate elementary grade levels. Standardized change score analysis is recommended by Kenny (1975) for comparing compensatory education with other groups of students.

Comparisons between study and comparison groups were limited to students who were promoted to the next grade in both 1988 and 1989 to insure that all students in a given grade in spring 1988 took the same test in spring 1989 and spring 1990.

REFERENCES

Kenny, David A. (1975). A quasi-experimental approach to assessing treatment effects in the nonequivalent control group design. Psychological Bulletin, 82, 345-362.

Ramey, Madelaine. (1990). Compensatory Education Sustained Gains from Spring 1985 to Spring 1987. Seattle School District Report 90-4, October.

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TABLE 1A

SPRING CAT READING SCALE SCORES
BY YEAR AND READING MODEL
FOR PRIMARY GRADES

	1988		1989		1990		
Reading Model	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation	N
Pull-Out*	493.0	75.6	622.3	62.9	664.8	50.6	220
CAI*	467.8	66.9	615.1	65.4	660.0	45.9	62
HOSTS	503.8	93.8	634.6	54.0	671.7	43.5	18
RRS	523.1	91.1	634.9	67.3	670.9	48.1	99
No Intervention	619.7	83.2	690.6	56.4	720.0	46.6	3,165

TABLE 1B

SPRING CAT MATH SCALE SCORES
BY YEAR AND MATH MODEL
FOR PRIMARY GRADES

	1988		1989		1990		
Math Model	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation	N
Pull-Out*	533.3	63.8	650.0	49.3	679.4	40.0	224
CAI	530.8	72.4	643.7	52.3	667.1	46.7	55
No Intervention	634.1	68.2	696.0	48.8	720.0	40.2	3,195

* When scale scores are standardized, the average value of the 1990 score minus the 1988 score is significantly greater ($p < .05$) for these students than for the No Intervention comparison students.

TABLE 2A

SPRING CAT READING SCALE SCORES
BY YEAR AND READING MODEL
FOR INTERMEDIATE ELEMENTARY GRADES

	1988		1989		1990		
Reading Model	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation	N
Pull-Out*	645.1	33.8	681.6	29.6	703.0	28.0	208
CAI	644.9	31.3	672.8	28.6	691.7	28.1	76
HOSTS	643.4	30.7	678.6	33.4	696.1	31.0	59
RRS	656.6	24.5	685.3	27.2	699.5	28.1	71
No Intervention	712.3	49.9	729.6	43.1	745.9	39.4	3,468

TABLE 2B

SPRING CAT MATH SCALE SCORES
BY YEAR AND MATH MODEL
FOR INTERMEDIATE ELEMENTARY GRADES

	1988		1989		1990		
Math Model	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation	N
Pull-Out*	658.7	31.4	702.7	31.3	713.3	32.5	271
CAI	662.1	32.5	700.4	24.1	710.6	26.6	90
No Intervention	715.8	39.7	736.2	36.9	756.6	38.4	3,056

* When scale scores are standardized, the average value of the 1990 score minus the 1988 score is significantly greater ($p < .05$) for these students than for the No Intervention comparison students.

FIGURE 1A

CAT AVERAGE TOTAL READING SCORES (STANDARDIZED) FOR SPRING 1988, 1989, AND 1990 BY READING MODEL FOR PRIMARY ELEMENTARY STUDENTS

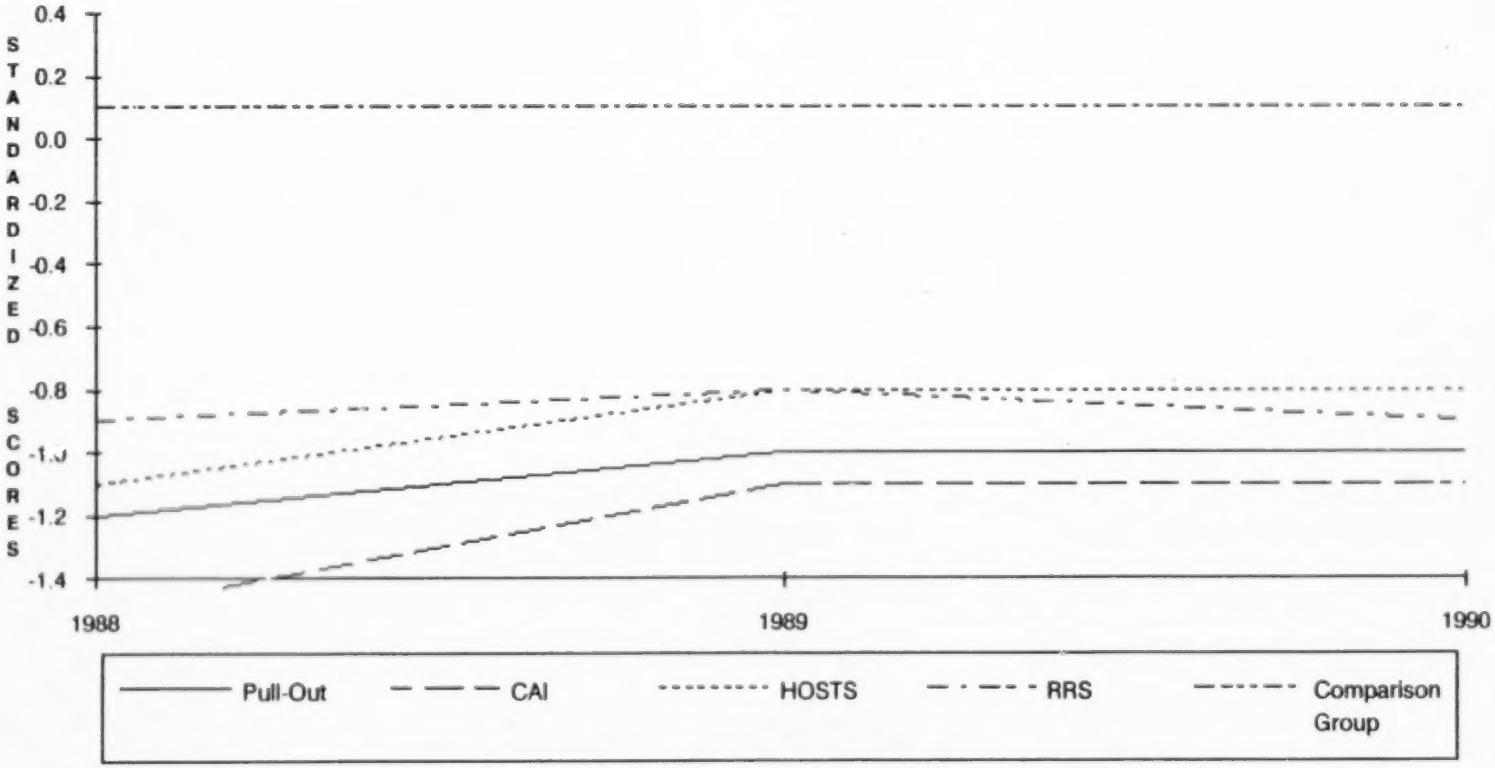

FIGURE 1B

CAT AVERAGE TOTAL MATH SCORES (STANDARDIZED) FOR
SPRING 1988, 1989, AND 1990 BY READING MODEL
FOR PRIMARY ELEMENTARY STUDENTS

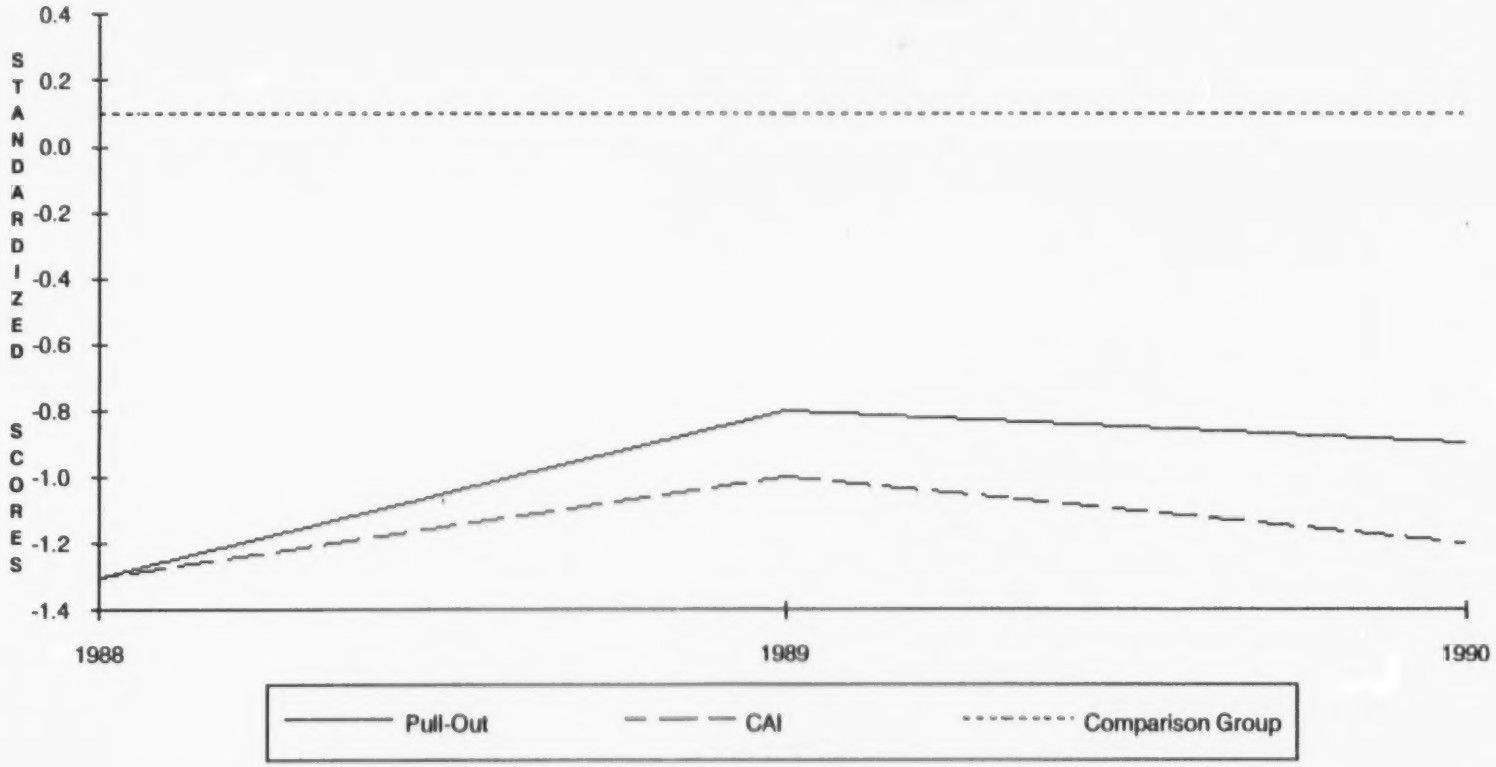

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FIGURE 2A

CAT AVERAGE TOTAL READING SCORES (STANDARDIZED) FOR
SPRING 1988, 1989, AND 1990 BY READING MODEL
FOR INTERMEDIATE ELEMENTARY STUDENTS

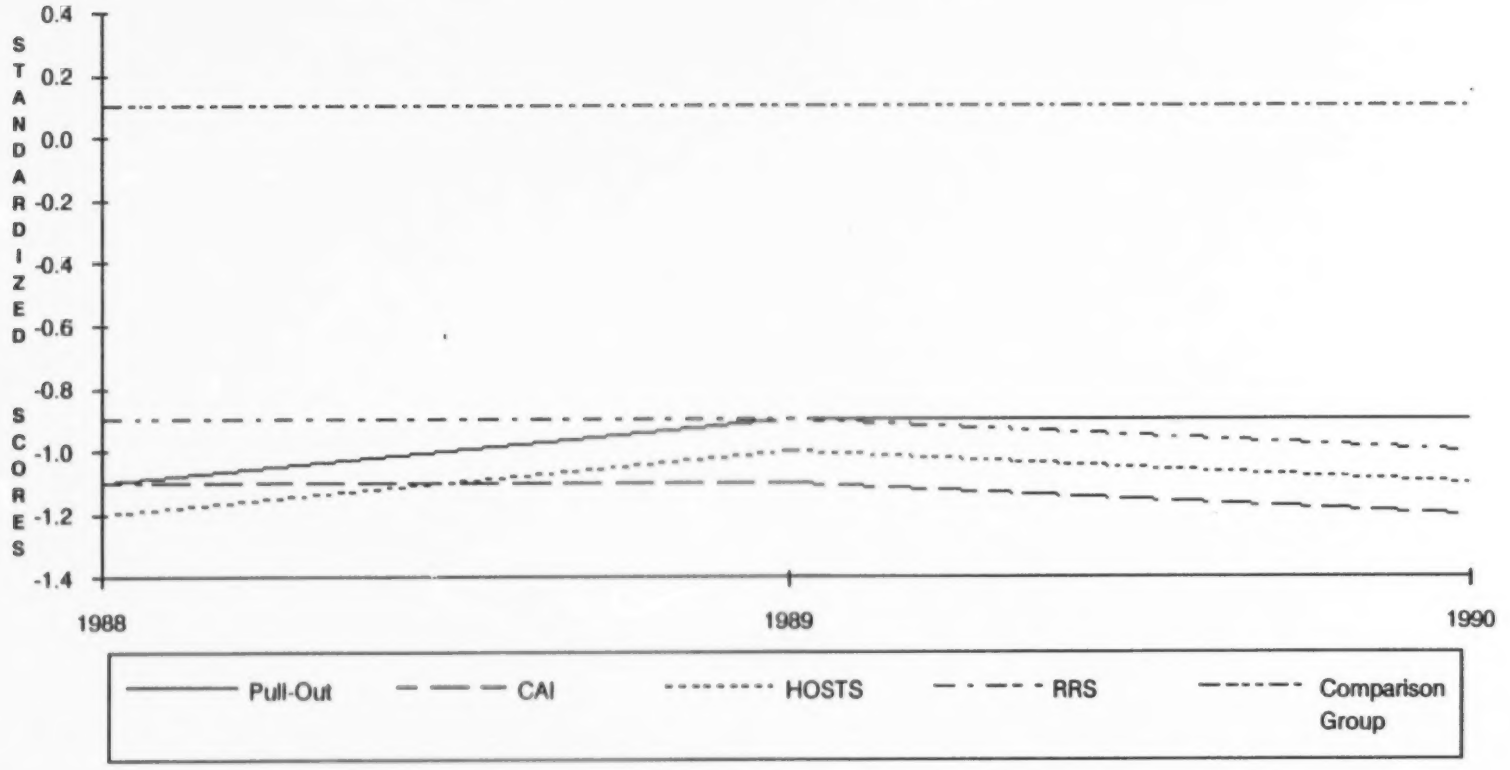
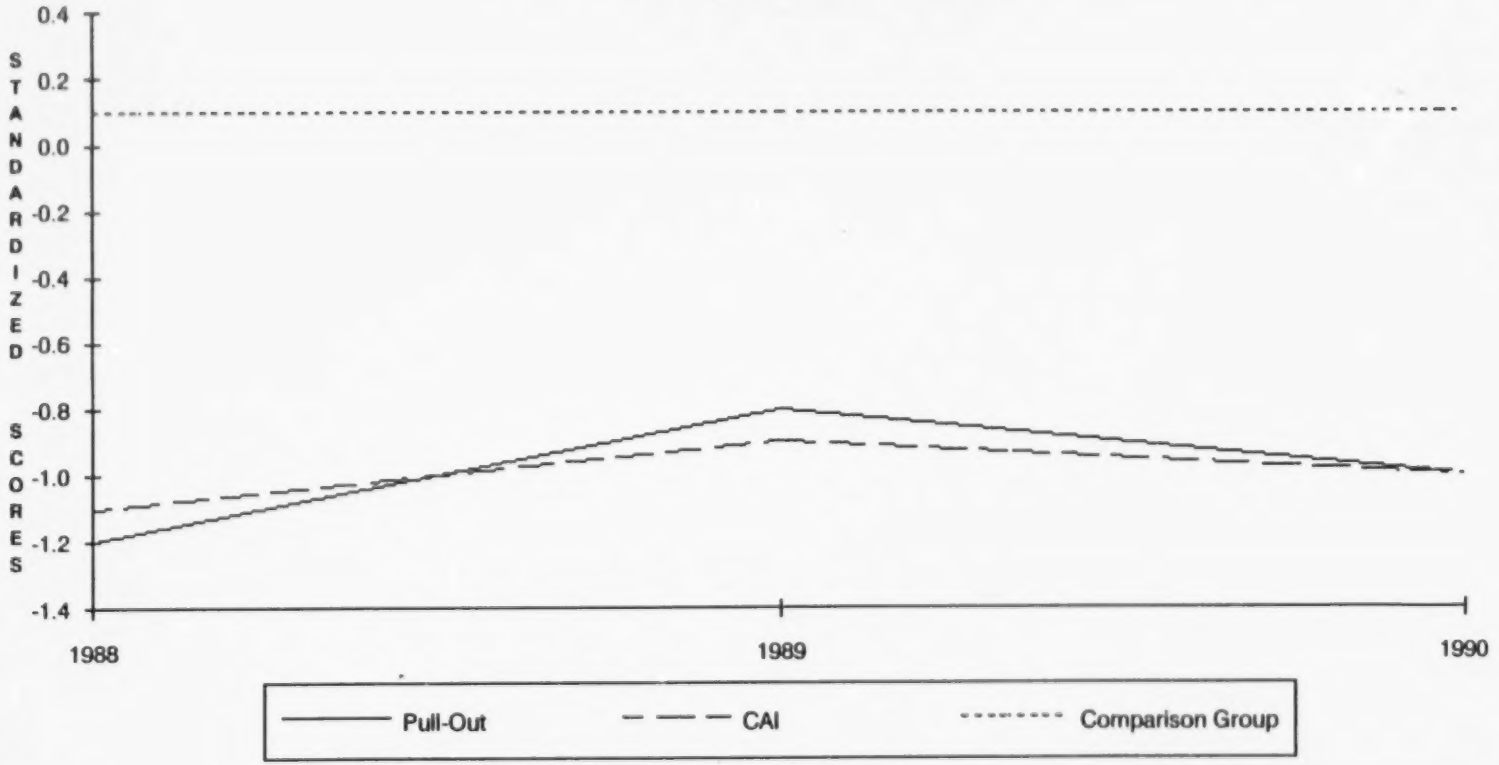


FIGURE 2B

CAT AVERAGE TOTAL MATH SCORES (STANDARDIZED) FOR
SPRING 1988, 1989, AND 1990 BY READING MODEL
FOR INTERMEDIATE ELEMENTARY STUDENTS



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